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ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
	10/826,917	AOYAMA, CHIAKI
Office Action Summary	Examiner	Art Unit	
	Jason M. Repko	2628	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL.**   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459

(1966), that are applied for establishing a background for determining obviousness under 35

U.S.C. 103(a) are summarized as follows:

1.   Determining the scope and contents of the prior art.
2.   Ascertaining the differences between the prior art and the claims at issue.
3.   Resolving the level of ordinary skill in the pertinent art.
4.   Considering objective evidence present in the application indicating obviousness or nonobviousness.

3.   **Claims 1, 6, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over**

U.S. Patent No. 5,594,850 to Noyama et al (herein referred to as "Noyama et al") in view of

U.S. Patent No. 6,028,606 to Kolb et al (herein referred to as "Kolb et al").

4.   With regard to claim 1, Noyama et al discloses "a method for compositing a computer-

graphics image and a picture taken by a camera *(lines 41-44 of column 4: "Some specific objects*

of the invention are: (1) to create a composite image from a CG image and a natural image...")

comprising:

a.   defining a three-dimensional model, a viewpoint *(lines 26-29 of column 6: "In*

FIG. 1, a CG model 10 consists of an object shape model 12 made up of object shape and

object surface attributes, a light source model 14 including the light source position and

light properties, and an eye position 16."), and a plane of projection, in a space

established on a computer *(lines 29-34 of column 6: "In ordinary computer graphics, the*

aim is to create a CG image 20 projected on a two dimensional plane, which will not be

described since it is well known. In this invention, however, in addition to data gathering

by creating the CG image 20 as in the prior art...");

b.   tracing the lines of sight extending from the viewpoint through the plane of

projection and the three-dimensional model to obtain attributes of portions of the three-

dimensional model corresponding to the projection pixels *(line 66 of column 7 through*

line 3 of column 8: "The ray tracing starts from the eye 16 and continues along a straight

line connecting the eye 16 and the pixel being processed on the projection plane until

striking an object, e.g. a shape object 12 (104), then a check is made as to whether or not

the object struck is the light source 14 (106)."), thereby forming a two-dimensional image

of the three-dimensional model on the plane of projection *(lines 39-41 of column 8: " The*

determined pixel color is written to the intrinsic image 28 (126). "); and

c.   superposing *(Figure 8)* the two-dimensional image *(20)* on the picture *(30)* to

generate a composite image *(50)* *(lines 22-29 of column 10: "Then the simulation section*

300 creates a final composite image by combining the transformation data for only the

window (not the inside wall) of the memory section 354, on top of the temporary

composite image. The final composite image 50 displays a region 55 including the object

66 in front of the interior wall and in the room behind the glass of the window 64.")."

5.   Noyama et al does not expressly disclose "defining lines of sight extending from the

viewpoint to projection pixels on the plane of projection so that each of the lines of sight

conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the

camera."

6.   Kolb et al discloses a function to define lines of sight based upon the "calibration data"

for a camera system, and "defines lines of sight extending from the viewpoint to projection

pixels on the plane of projection so that each of the lines of sight conforms with a ray of light

incident on a pixel corresponding thereto of the picture taken by the camera" (*lines 57-59 of*

column 12: "After computing W the ray tracing algorithm is applied to construct (108) a ray

from x' to x", and then compute (110) the ray from x" to the scene data"; lines 6-9 of column 8:

"Rather than computing the direction of a ray using the ray tracing procedure directly, ray

tracing can alternatively be used to define a function that accurately approximates the way in

which rays are acted upon by the lens system.").

7.   At the time of the invention, it would have been obvious to a person of ordinary skill in

the art to use the physical camera model calibration data as taught by Kolb et al to determine the

direction of the rays in the method and system for compositing acquired and synthetic images

disclosed by Noyama et al. The suggestion and motivation for doing so is given by Kolb et al in

lines 39-49 of column 2:

> *For example in many applications (video special effects, augmented reality, etc.) it is*
>
> *desirable to seamlessly merge acquired imagery with synthetic imagery...In both of these*
>
> *situations it is important that the synthetic imagery be computed using a camera model*
>
> *that closely approximates the real camera and lens system.*

Therefore, it would have been obvious to combine Noyama et al with Kolb et al to obtain the

invention specified in claim 1.

8.   With regard to claim 6, the program recited is similar in scope to a computer

implementation of the method of claim 1; Noyama et al discloses a computer implementation in

lines 24-29 of column 13: *"As explained in the foregoing, in accordance with the present*

invention images created with computer graphics are automatically and simultaneously

transformed into transformation data that can be directly handled in image simulation and,

therefore, a computer running an image simulation program can be immediately used for

creating composite images with natural images. " Claim 6 is rejected with the rationale of claim

1.

9.   With regard to claim 7, Noyama et al discloses "a method for rendering a three-

dimensional model created by computer graphics into a two-dimensional image to be superposed

on a picture taken by a camera to form a composite image, the method comprising:

> d.   defining a viewpoint *(lines 26-29 of column 6)*, and a plane of projection, in a
>
> space established on a computer where the three-dimensional model is located *(lines 29-*
>
> *34 of column 6)*;
>
> e.   defining lines of sight extending from the viewpoint to projection pixels on the
>
> plane of projection *(lines 18-21 of column 9, see rejection of claim 1)*;
>
> f.   tracing the lines of sight extending from the viewpoint through the plane of
>
> projection and the three-dimensional model to obtain attributes of portions of the three-
>
> dimensional model corresponding to the projection pixels *(line 66 of column 7 through*
>
> *line 3 of column 8)*; and
>
> g.   setting the obtained attributes of the portions of the three-dimensional model to
>
> the projection pixels corresponding thereto, to form a two-dimensional image of the

three-dimensional model on the plane of projection (*lines 39-41 of column 8; lines 22-29 of column 10*)."

10.   Noyama et al does not disclose "defining lines of sight extending from the viewpoint to projection pixels on the plane of projection so that each of the lines of sight conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the camera." Kolb et al discloses this limitation in lines 57-59 of column 12 as shown in the rejection of claim 1.

11.   At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the physical camera model calibration data as taught by Kolb et al to determine the direction of the rays in the method and system for compositing acquired and synthetic images disclosed by Noyama et al. The suggestion and motivation for doing so is given by Kolb et al in lines 39-49 of column 2 as shown in the rejection of claim 1. Therefore, it would have been obvious to combine Noyama et al with Kolb et al to obtain the invention specified in claim 7.

12.   With regard to claim 10, the program recited is similar in scope to a computer implementation of the method of claim 7; Noyama et al discloses a computer implementation in lines 24-29 of column 13: *"As explained in the foregoing, in accordance with the present invention images created with computer graphics are automatically and simultaneously transformed into transformation data that can be directly handled in image simulation and, therefore, a computer running an image simulation program can be immediately used for creating composite images with natural images. "* Claim 10 is rejected with the rationale of claim 7.

13.   **Claims 2, 3, 4, 8, 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noyama et al in view of Kolb et al and in further view of Benjamin**

Mora, Jean Pierre Jessel, René Caubet, "A New Object-Order Ray-Casting Algorithm,"

October 27, 2002, Proceedings of the Conference on Visualization '02 (herein referred to as

"Mora et al").

14.   With regard to claims 2 and 8, Noyama et al discloses the limitations of parent claim 1,

but does not disclose a calibration table correlating pixel positions and directions of rays of light.

Kolb et al discloses a function to define lines of sight based upon the "calibration data" for a

camera system, "wherein the lines of sight are defined based upon the directions and positions of

the rays of light incident on the pixels of the picture corresponding to the projection pixels"

(lines 57-59 of column 12).

15.   Kolb et al does not disclose using a table to store and access the rays computed using the

lens simulation function. Mora et al stores precomputed ray data corresponding to pixel

positions. Mora et al discloses "providing a table having first data and second data correlated

with each other *(Figure 2)*, the first data concerning positions of pixels *(section 3.1: " Therefore,*

a square made of four neighboring pixels is subdivided and a list of relative coordinates

corresponding to the projection of the cell is associated with each subdivision (Pixel index in fig.

2a).")*, the second data concerning ray data *(section 3.1: " The set of preprocessed rays (fig. 2b)*

is used to find out the ray entry point within the cell...Thus, a ray number pointing to the best

representative preprocessed ray is assigned to every pixel of the projection lists (ray index in fig

2a).")*.

16.   At the time of the invention, it would have been obvious to a person of ordinary skill in

the art to modify the system disclosed by Noyama et al as modified by Kolb et al to store the

pixel to ray correspondences, as well as the directions and positions of rays in a table as taught

by Mora et al. The motivation for doing so would have been to avoid redundant computation during rendering, as this advantage of precomputing and storing the results is well known in the art. Therefore, it would have been obvious to further modify the combination of Noyama et al and Kolb et al with Mora et al to obtain the invention specified in claims 2 and 8.

17.   With regard to claims 11 and 12, the program recited is similar in scope to a computer implementation of the method of claim 2; Noyama et al discloses a computer implementation in lines 24-29 of column 13. Claims 11 and 12 are rejected with the rationale of claim 2.

18.   With regard to claim 3, Noyama et al discloses "compositing a computer-graphics image created by rendering a three-dimensional model and a picture taken by a camera (*Figure 8, see rejection of claim 1*), comprising:

>   h.   obtaining lines of sight extending from a viewpoint to the three-dimensional model (*lines 18-21 of column 9, see rejection of claim 1*);
>
>   i.   generating a two-dimensional image on the plane of projection from the three-dimensional model (*lines 39-41 of column 8, see rejection of claim 1*) by tracing the lines of sight so as to obtain attributes of portions of the three-dimensional model corresponding to the projection pixels on the plane of projection (*line 66 of column 7 through line 3 of column 8, see rejection of claim 1*);
>
>   j.   superposing the two-dimensional image on the picture, to generate a composite image (*lines 22-29 of column 10, see rejection of claim 1*)."

19.   Noyama et al does not expressly disclose basing the line of sight calculation on the acquired imagery and corresponding camera. With regard to lines 10-12 of claim 3, Kolb et al discloses "each of lines of sight passing through projection pixels on a plane of projection

conforms with a ray of light incident on a pixel corresponding thereto of the picture taken by the

camera" and basing the line of sight calculations "upon the directions and positions of the rays of

light incident on the pixels of the picture" (*lines 57-59 of column 12, see rejection of claim 1*).

As shown in the rejection of claim 1, it would have been obvious to one of ordinary skill in the

art to modify Noyama et al with Kolb et al to model the lines of sight after those of the picture

taken by the camera to obtain the advantage of "seamlessly merging acquired imagery with

synthetic imagery" as suggested by Kolb et al.

20.   With regard to the limitations recited in lines 3-6 of and lines 9-10 of claim 3, Noyama et

al does not disclose a "calibration storage unit" or "looking up directions and positions." The

limitations recited in lines 3-6 of and lines 8-10 of claim 3 are similar in scope to the limitations

recited in claim 2. As shown in the rejection of claim 2, it would have been obvious to one of

ordinary skill in the art to further modify the combination of Noyama et al and Kolb et al with

the precomputed table disclosed by Mora et al to obtain the advantage of computational

efficiency.

21.   Noyama et al does not expressly disclose an "apparatus" with "units." At the time of the

invention, it would have been obvious to a person of ordinary skill in the art to implement the

functionality of the method taught by the combination of Noyama et al, Kolb et al, and Mora et

al in hardware. Kolb et al suggests an apparatus in lines 8-11 of column 15: "Additionally, a real

time virtual camera could be implemented in hardware." The motivation for doing so would

have been to obtain a performance gain, as suggested by Kolb et al in lines 8-12 of column 15:

"In this example, one would make a thick lens approximation to the lens system...which allows

for speedy real time rendering." Therefore, it would have been obvious to combine Noyama et al,

Kolb et al and Mora et al to obtain the invention specified in claim 3.

22.   Claim 9 is rejected with the rationale of claim 3. Claim 9 recites a calibration table, a

line-of-sight calculation unit, and a two-dimensional image generation unit similar in scope to

the corresponding computational units recited in claim 3. Furthermore, Noyama et al discloses

"rendering a three-dimensional model created by computer graphics into a two-dimensional

image to be superposed on a picture taken by a camera to form a composite image" in Figure 8.

23.   With regard to claim 4, parent claim 3 is met by the combination of Noyama et al, Kolb

et al and Mora et al. Kolb et al further discloses the process of tracing a ray of light which strikes

an image point x' and a "displacement from a base point" in lines 28-31 of column 10: "A point

70 of intersection of a ray from x' to S with P' is found, and then translated parallel to the axis to

a point 74 on P. A ray from 74 through x, the image of x', is then used to sample the scene."

24.   At the time of the invention, it would have been obvious to a person of ordinary skill in

the art to further modify the combination of Noyama et al, Kolb et al and Mora et al to store the

direction in which a ray strikes on a pixel, and a displacement from a base point as disclosed by

Kolb et al in a table as taught by Mora et al. The motivation for doing so would have been to

avoid redundant computation of these values during rendering calculations. Therefore, it would

have been obvious to further modify the combination of Noyama et al, Kolb et al and Mora et al

to obtain the invention specified in claim 4.

25.   **Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noyama et al**

in view of Kolb et al in further view of Mora et al and in further view in F. S. Hill, Jr.

"Computer Graphics Using OpenGL," May 15, 2000, 2nd Edition, Prentice Hall (herein referred to as "Hill").

26.   With regard to claim 5, the combination of Noyama et al, Kolb et al and Mora et al does not show storing as "two points on the incident light." On page 148, Hill teaches representing a vector as a difference of two points Q and P. On page 147, Hill states "it is valuable to think of a vector geometrically as a displacement from one point to another."

27.   At the time of the invention, it would have been obvious to a person of ordinary skill in the art to represent the rays in storage in the system disclosed by the combination of Noyama et al, Kolb et al and Mora et al with two points as disclosed by Hill. The motivation for doing so would have been to simplify logic and storage by representing direction, magnitude, and spatial orientation with two analogous entities. Therefore, it would have been obvious to further modify Noyama et al, Kolb et al and Mora et al with Hill to obtain the invention specified in claim 5.

Claim Rejections - 35 USC § 101

28.   The rejections of claims 6, 10, 11 and 12 under 35 USC 101 are withdrawn.

Drawings

29.   The drawings submitted 4/21/2006 are accepted.

Response to Arguments

30.   Applicant's arguments filed 4/21/06 have been fully considered but they are not persuasive.

31.   With regard to the rejection of claims 1, 6, 7, and 10 under 35 USC 103 (a) as being unpatentable over Noyama et al in view of Kolb et al, Applicant asserts the rejection is "improperly based on a suggestion coming entirely from the Examiner, rather than from any

teaching or suggestion which may be fairly gleaned from the references themselves." In

response, it is noted that the rejection of claim 1 (*paragraph 12 of the Office Action dated*

January 26, 2006) states the suggestion to combine Kolb et al and Noyama et al references is

given by <u>Kolb et al</u> in lines 39-49 of column 2:

> *For example in many applications (video special effects, augmented reality, etc.) it is*
>
> *desirable to seamlessly merge acquired imagery with synthetic imagery...In both of these*
>
> *situations it is important that the synthetic imagery be computed using a camera model*
>
> *that closely approximates the real camera and lens system.*

Noyama et al discloses a system that "merges acquired imagery with synthetic imagery," as

shown in Figure 8. Kolb et al discloses a system and method that "approximates the real camera

and lens system" to compute "synthetic imagery" to improve such systems, as stated in lines 39-

49 of column 2. Therefore, the suggestion and motivation to combine does not come "entirely

from the Examiner" guided by improper hindsight.

32.   Furthermore, it must be recognized that any judgment on obviousness is in a sense

necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account

only knowledge which was within the level of ordinary skill at the time the claimed invention

was made, and does not include knowledge gleaned only from the applicant's disclosure, such a

reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In

this case, the Kolb et al reference provides the suggestion for combination as previously stated,

and one of ordinary skill in the art would recognize that the teachings of Kolb et al are applicable

to the ray-tracing step of Noyama et al.

33.   With regard to the first paragraph of page 14, it should be noted that the ray tracing

procedure referenced in line 66 of column 7 through line 3 of column 8 determines both the pixel

color of the two dimensional "intrinsic image" comprising color and pixel intensity (*lines 39-40*

of column 8) and the mask image, as shown in Figure 3.

34.   On pages 14-16, Applicant asserts Noyama et al teaches away from the claimed

invention, as Noyama et al "combines only the cut out portion, not the entire portion, of the

natural image." In response, it is noted that the features upon which applicant relies (i.e., not

combining a manually cut out portion, but the entire portion) are not recited in the rejected

claim(s). Although the claims are interpreted in light of the specification, limitations from the

specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993). Furthemore, a portion of an natural image obtained by manually

extracting it from another natural image as disclosed in Noyama et al is analogous to "a picture

taken by a camera" as recited in claim 1. A composite image disclosed by Noyama et al is

analogous to the composite image as recited in claim 1 as further evidenced by lines 11-21 of

column 9:

> *In the present invention, the natural image region has its color pixel values substituted as*
>
> *an appropriate value for one of the variables shown in FIG. 12 so that the object cut from*
>
> *the natural image will change when combined into the composite image depending upon*
>
> *the other variables of FIG. 12. For example, the pixel colors of the natural image region*
>
> *may determine values of data 158, or 152, or 160 automatically, so that each pixel of the*
>
> *composite image that is in a region common to the natural and CG images will have its*
>
> *data 160, 170, 154, 156, 14 taken from the CG image.*

35.   In response to the argument on page 16 that "they [Kolb et al] fail to teach or suggest

anything related to superimposing the two-dimensional image on the picture to generate a

composition image," one cannot show nonobviousness by attacking references individually

where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413,

208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir.

1986). Furthermore, as previously stated, Kolb et al suggests the disclosed invention would have

an application in superimposing the two-dimensional image on the picture to generate a

composition image in lines 39-49 of column 2. The Noyama et al reference shows

"superimposing the two-dimensional image on the picture to generate a composition image." It

would have been obvious to one of ordinary skill in the art to combine the teachings of Kolb et al

and Noyama et al to obtain the invention recited in claim 1.

36.   In response to the argument Kolb et al fails to "disclose the method of defining lines of

sight extending from the viewpoint to projection pixels on the plane of projection so that each of

the lines of sight conforms with a ray of light incident on a pixel corresponding thereto of the

picture taken by the camera," it is noted that the Kolb et al system and method are used to

simulate the process of image formation of a physical camera system (*lines 6-9 of column 8*), and

creates "an image which approximates an image produced by the physical camera" (*abstract*).

The relationship between an image generated by the physical camera image and the computer-

generated images is clearly stated in the abstract of the Kolb et al reference, and further disclosed

in lines 28-36 of column 3 (emphasis added):

> *When given the manufacturer's specifications of the physical camera's lenses, including*
>
> *the dimensions and indices of refraction of its lenses, stops, and shutter characteristics,*

the location of the film surface relative to the lens system, and the orientation of the

camera within the scene, the invention accurately and efficiently <u>mimics the physical</u>

<u>principles of image formation creating an image which approximates an image produced</u>

<u>by the physical camera.</u>

Therefore, the assertion in paragraph 11 of the Office Action dated January 26, 2006 regarding

the correspondence between the simulated rays of light forming image in the graphics system

and the physical rays of light forming an image in the physical camera system is accurate.

37.   In response to the argument "a person of ordinary skill in the art would not consider the

hypothetical modification of Noyama et al" because the Kolb et al system destroys and has no

application in the Noyama et al system, this assertion is incorrect. The method disclosed by Kolb

et al creates a computer graphics image by tracing rays *(lines 57-59 of column 12; lines 6-9 of*

column 8; lines 16-26 of column 6), the method disclosed by Noyama et al also teaches creating

a computer graphics image by tracing rays *(line 66 of column 7 through line 3 of column 8; lines*

39-41 of column 8). One of ordinary skill in the art would recognize that modifying the Noyama

et al ray tracing step by using the physical camera model calibration data as taught by Kolb et al

to determine the direction of the rays would not have destroyed the invention disclosed by

Noyama et al. In fact, modifying the ray directions as taught by Kolb et al in the system

disclosed by Noyama et al would result in a different computer generated image that would

better suited to be merged with the "natural image." While "the Noyama et al system does not

require such characteristics" as stated on page 17 of Applicant's remarks, Kolb et al suggests a

modification to such systems would be desirable in lines 39-49 of column 2.

38.   The process of the creation of the "mask image" in the Noyama et al reference is not

destroyed by the incorporation of the teachings of Kolb et al in the Noyama et al system as

asserted by the Applicant on page 17. As previously shown, the Noyama et al reference creates

images by tracing rays, and the Kolb et al reference teaches "tracing the ray through the lens

system to determine an ultimate direction of the ray in object space" (lines 11-12 of column 4).

Therefore, modifying the direction of the ray according to the teachings of Kolb et al in the

manner described in paragraph 12 of the Office Action dated January 26, 2006 is compatible

with the image generation process of Noyama et al.

39.   Furthermore, it is noted that the features upon which applicant relies in the argument

presented in the first paragraph on page 18 (i.e., not combining a manually cut out portion, and

not depending on the specification of a physical camera) are not recited in the rejected claim(s).

As previously stated, although the claims are interpreted in light of the specification, limitations

from the specification are not read into the claims. See In re Van Geuns, 988 F.2d 1181, 26

USPQ2d 1057 (Fed. Cir. 1993).

40.   In response to Applicant's argument "Mora et al fails to disclose a calibration table

having first data and second data correlated with each other" as a result "the claims are believed

to be patentably distinct from the claimed invention," one cannot show nonobviousness by

attacking references individually where the rejections are based on combinations of references.

See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091,

231 USPQ 375 (Fed. Cir. 1986). Mora et al stores precomputed ray data corresponding to pixel

positions. Mora et al discloses "providing a table having first data and second data correlated

with each other (Figure 2), the first data concerning positions of pixels (section 3.1: "Therefore,

a square made of four neighboring pixels is subdivided and a list of relative coordinates

corresponding to the projection of the cell is associated with each subdivision (Pixel index in fig.

2a). "), the second data concerning ray data (*section 3.1: " The set of preprocessed rays (fig. 2b)*

is used to find out the ray entry point within the cell...Thus, a ray number pointing to the best

representative preprocessed ray is assigned to every pixel of the projection lists (ray index in fig

2a). "). It is this teaching in combination with the calibration data disclosed by Kolb et al that

renders claims 2 and 8 obvious in view of the referenced prior art.

41.   In response to the argument the Hill, Jr. reference is non-analogous art, it has been held

that a prior art reference must either be in the field of applicant's endeavor or, if not, then be

reasonably pertinent to the particular problem with which the applicant was concerned, in order

to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977

F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Hill, Jr. is in the field of the

applicant's endeavor: computer graphics. Additionally, Hill, Jr. is reasonably pertinent to the

particular problem: representations of a vector in a computer graphics system. In the referenced

section of chapter 4, Hill, Jr. teaches "this broad applicability [of vector arithmetic] makes it

possible to bring together various cases that arise in graphics into a single expression, which can

then be applied to a variety of tasks" (*p. 147*). One of ordinary skill in the art would recognize

that the difference of two points would be an advantageous representation of a ray in the given

context as shown in the rejection of claim 5.

Conclusion

42.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jason M. Repko whose telephone number is 571-272-8624. The

examiner can normally be reached on Monday through Friday 8:30 am -5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER